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RESEARCH ARTICLE

The rapid expansion of *Sphenophorus venatus* in the Balkans and Eastern Mediterranean, and notes on the west palearctic *Sphenophorus* (Coleoptera, Curculionidae)

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Abstract

Sphenophorus venatus (Say, 1831), a species native to the Nearctic region, has recently been recorded in multiple Eastern Mediterranean and Balkan countries. This study compiles new records based on field surveys and citizen science platforms, confirming the species' presence in Albania, Bulgaria, mainland Greece, Italy (including Sardinia and Sicily), Israel and Turkey. Clarifications of its distinction from related species in the western Palearctic, alongside notes on the *Sphenophorus* species in the region are provided.

Keywords

Curculionidae, Dryophthorinae, *Sphenophorus*, invasive species, new records.

Introduction

Sphenophorus venatus (Say, 1831) is a Coleoptera species belonging to the family Curculionidae, native to the Nearctic region, where it is known to be a pest of some grasses and corn (Dupuy and Ramirez 2016). Recently, the species has been introduced to several areas within the Palearctic region, including Morocco (Pelletier 2005), Spain (Alonso-Zarazaga and Sánchez-Ruiz 2009), France (Orousset et al.

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2008), the island of Corfu (Greece) (Korotyaev and Apt 2018), Cyprus (Kakouris et al. 2021) and most recently Egypt (El-Maghraby et al. 2022).

In some recent literature, *S. venatus* has sometimes been referred to as *S. placidus* Say, 1831 (e.g., Korotyaev and Apt 2018; Kakouris et al. 2021), a name revived from synonymy with *S. venatus* after the latter was designated as the senior subjective synonym of *S. destructor* Chittenden, 1906 (Prena 2018), although this change was made without substantial explanation. These taxonomic adjustments, however, have not gained widespread acceptance. Most recent works continue to refer to the species as *S. venatus*, commonly under the subspecies *S. venatus vestitus* Chittenden, 1904 (e.g., Gireesh and Shimat 2020; Van Dyke et al. 2023; Ferreira et al. 2024), and sometimes without any subspecies designation (Duffy and Richmond 2020; Rodriguez-Soto et al. 2021; El-Maghraby et al. 2022). The distinctions among the subspecies of *S. venatus* are minor, with considerable variability even within subspecies (Vaurie 1951), and accurate identification would require a large series of specimens and direct comparisons (Alonso-Zarazaga and Sánchez-Ruiz 2009; Lompe 2024)—a level of analysis outside the scope of this study. Therefore, we refer to *S. venatus* without subspecific designation and to honor Say's original classification, acknowledging its historical precedence and widespread use in economic literature.

The genus *Sphenophorus* Schönherr, 1838, includes five west Palearctic species: *S. meridionalis* (Gyllenhal, 1838), *S. abbreviatus* (Fabricius, 1787), *S. parumpunctatus* (Gyllenhal, 1838), *S. piceus* (Pallas, 1776) and *S. striatopunctatus* (Goeze, 1777) (Alonso-Zarazaga et al. 2017). Additionally, two more species of the subtribe *Sphenophorina* Lacordaire, 1865, have been established in the western Palearctic. The Nearctic species *Scyphophorus acupunctatus* Gyllenhal, 1838, has been introduced to various parts of Europe, while the Asian species *Cosmopolites sordidus* (Germar, 1824) is now present in Spain and the Azores (Alonso-Zarazaga et al. 2017). Both invasive species closely resemble members of the genus *Sphenophorus*.

During 2024, *S. venatus* was recorded in Albania, Bulgaria, and mainland Greece. Previously, it was introduced to Sardinia (2008) (Forum Natura Mediterraneo 2024), Sicily (2012) (Forum Entomologi Italiani 2024), Turkey (2014), Crete (2019), Lesbos (2020), Rhodes (2021), mainland Italy (2021), Israel (2022) (INaturalist 2024), though these records were not documented in literature, mostly due to confusion with the european *S. meridionalis*.

The findings presented here indicate the species' previously undocumented rapid spread across the Balkans and the eastern Meditteranean.

Materials and Methods

In Athens, live specimens of *S. venatus* were collected on the campus of the Agricultural University of Athens and in a local park on Peristeri, while a specimen was found a year later near a park in Nemea (northern Peloponnese). Specimens from Turkey and Sardinia (Italy) were obtained in similar settings during holiday trips.

Additional records from Albania, Bulgaria, Israel, Italy, Sicily, Sardinia, Turkey, and the Greek islands of Crete, Rhodes, and Lesbos were gathered from photographic observations on the website iNaturalist and the web forums Natura Mediterraneo and Entomologi Italiani. The rest of the species used for comparisons here, were collected in various localities around Greece and nearby countries, usually near water concentrations in rural or mountainous areas.

All the specimens are preserved dry, pinned or glued on carton boards, in the authors collections. The confirmation of the identity of *S. venatus* was based on Vaurie's descriptions (1951), while the identification of the other Palearctic species was made with the key and descriptions of Hoffmann (1954) and Legalov (2023).

Specimens examined:

Sphenophorus venatus Say, 1831

Greece: Athens: Agricultural University of Athens, on turfgrass (37.98413; 23.70629), 1 ind., 12.IV.2024, leg. Georgios Gastouniotis (GG); Peristeri, on turfgrass (38.01423; 23.69683), 1 ind., 3.X.2024, leg. Georgios Kakiopoulos (GK); same locality, 1 ind., 12.X.2024, leg. GK; Nemea (37.81488; 22.66613), 1 ind., 9.VI.2025, leg. GG

Italy: Sardinia, Cagliari, La Maddalena beach, 1 ind., 13.IX.2023, leg. Carlos de Queros (collection of GG)

Turkey: Alexandretta (Iskenderun), on beach park turfgrass, 2 ind., 7.VI.2014, leg. GK

Sphenophorus parvulus Gyllenhal, 1838

Canada: no data, 1 ind., 2016, collection of GG

Sphenophorus abbreviatus (Fabricius, 1787)

Croatia: near Dubronvik, in the bank of small lake, 1 ind., 12.VII.2019, leg. GK

Turkey: Priapos Mysias (near Karabuga), 1 ind., 12.VII.2000, leg. GK

Sphenophorus meridionalis Gyllenhal, 1838

Greece: Thrace, NW bank of lake Mitrikou, 1 ind., IV.1989, leg. GK

Sphenophorus parumpunctatus Gyllenhal, 1838

Greece: Argolis, near Timenio (37.57730; 22.72234), 1 ind. dead-dry, 5.VII.2016, leg. GG; same locality, during night next to irrigation canal, 1 ind., 20.VII.2022, leg.

GG; Ilia, under log in field near Epitalio beach (37.59691; 21.51241), 1 ind., 3.II.2019, leg. GK

Sphenophorus piceus (Pallas, 1771)

Greece: Thrace, mount Papikio, near Machaira military outpost, under stone, 650 m., 1 ind., I.1989, leg. GK; Korinthia, Nemea (37.81494; 22.66599), 1 ind., 15.VI.2019, leg. GG

Sphenophorus striatopunctatus (Goeze, 1777)

Italy: Toscana, Parco Fluviale Lastra a Signa, 1 ind., 23.IV.2024, leg. Carlos de Queros (collection of GG)

Scyphophorus acupunctatus Gyllenhal, 1838

Greece: Crete, Chania, on Agave plant, 6 ind., 18.VI.2016, collection of GG

France: Banyuls-sur-Mer, on Agave plant, 2 ind., 28.X.2017, leg. Herve Brustel (collection of GK)

Cosmopolites sordidus (Germar, 1824)

Philippines: Mindanao, Bogac Cold Sping, 2 ind., IV.2022, collection of GG

Individuals of *Sphenophorus venatus* Say, 1831 examined from photographs:

Albania: Qerret, 11.X.2024 (Andrii Khokhlov) (https://www.inaturalist.org/observations/246846628)

Bulgaria: Nesebar, 7.X.2024 (Galin Ivanov) (https://www.inaturalist.org/observations/247595599)

Greece: Crete: Limenas Chersonisou, 2.VII.2019 (https://www.inaturalist.org/observations/32069357); Kissamos, 2.X.2022 (Flore Marie Kaizer) (https://www.inaturalist.org/observations/137254944); Koutouloufari, 9.VI.2023 (Jyrki Sahinoja) (https://www.inaturalist.org/observations/171325593); **Rhodes:** Ammoudes, 29.VIII.2021 (Sven Wyns) (https://www.inaturalist.org/observations/92939431); Kameiros, 27.IV.2022 (Gintautas Steiblys) (https://www.inaturalist.org/

observations/117743435); **Lesbos:** Pyrgoi Thermis, 25.IV.2020 (Savvas Zafeiriou) (https://www.inaturalist.org/observations/43446801)

Israel: Ein HaMifratz, on turfgrass, 7.VI.2022 (Theodore Netanel) (https://www.inaturalist.org/observations/120681399); Rosh Haayin, 24.V.2024 (Avishag Sudakov) (https://www.inaturalist.org/observations/223685641); Beitar Illit, 21.X.2022 (Chaym Turak) (https://www.inaturalist.org/observations/148233125)

Italy: Puglia: near Riserva Naturale Le Cesine, 11.V.2021 (Fortunato Pititto) (https://www.inaturalist.org/observations/78350656); Bari, 6.V.2024 (Leonardo Antonio Argese) (https://www.inaturalist.org/observations/213930283); **Sardinia:** Cagliari, near salt flats, 23.VIII.2008 (https://www.naturamediterraneo.com/forum/topic.asp?TOPIC_ID=56723); Cagliari, 20.VII.2011 (Roberto Rattu) (http://www.entomologiitaliani.net/public/forum/phpBB3/viewtopic.php?f=240&t=24741&hilit=sphenophorus+meridionalis); Uri, near lake Cuga, 2.VIII.2012 (https://www.naturamediterraneo.com/forum/topic.asp?TOPIC_ID=184264); **Sicily:** Ribera, in field near Verdura Stream, 12.X.2012 (Marcello Romano) (http://www.entomologiitaliani.net/public/forum/phpBB3/viewtopic.php?f=240&t=39453&hilit=sphenophorus+meridionalis)

Turkey: Smyrna, 23.IV.2015 (Baris Cerci) (http://www.entomologiitaliani.net/public/forum/phpBB3/viewtopic.php?f=429&t=61117&hilit=sphenophorus+meridionalis&sid=7cf45aa46be248a038ef2843bfe07fe7); Adana, IV.2020 (https://www.inaturalist.org/observations/42096412); Altinoluk, 2.VIII.2023 (Merav Vonshak) (https://www.inaturalist.org/observations/176419227); Theira, 5.V.2022 (Tandoğan Oruz) (https://www.inaturalist.org/observations/115569173); Üzümlü, 2.VII.2022 (Kadir Kaan Gülcü) (https://www.inaturalist.org/observations/124390363); Antalya, 30.IV.2022 (https://www.inaturalist.org/observations/113716365)

Results and discussion

Sphenophorus venatus is readily distinguishable from all species of the subtribe *Sphenophorina* present in the western Palearctic due to its unique pronotum sculpturing and overall appearance (Fig. 1). The pronotum of *S. venatus* displays three slightly raised, abbreviated stripes, the central stripe forming a Y-shaped pattern, with fine punctures on the raised parts, interspersed among large pits filled with a waxy exudate (Fig. 2A), characteristics found in Nearctic species (Vaurie 1951). Adults vary in size from about 8–11 mm. Their coloration typically includes a brownish-red base with the raised parts of the pronotum and the elytral striation black, although entirely black individuals are occasionally observed. A pale, waxy coating covers the body, attracting dirt and debris. This waxy layer can be removed, yet *S. venatus* remains distinctive due to the elytra's striations, which consist of single

Figure 1. *Sphenophorus venatus* (Say, 1831) from Israel (credit: Theodore Netanel 2022).

or partially double lines of fine punctures in the elytral striae and larger pits in the elytral interstices (Fig. 2D).

In comparison, west palearctic species of the genus *Sphenophorus* exhibit a smoother pronotum with fine punctation (Fig. 2C). An exception is *S. meridionalis*, which has a densely punctured pronotum marked by a broad, raised midline flanked by unpunctured areas (Fig. 2B) (Reitter 1883; Hoffmann 1954). Their coloration is typically entirely black, with *S. meridionalis* having reddish brown elytra, although is not uncommon for individuals from all the species having reddish elytra too. The elytra of the west palearctic species lack the prominent pits found in the interstices of *S. venatus*, instead displaying fine punctation (Fig. 2F) or, in *S. meridionalis*, small pits (Fig. 2E).

Concerning the two other invasive species of the subtribe *Sphenophorina* — *Scyphophorus acupunctatus* and *Cosmopolites sordidus* — established in Europe, both are superficially similar with the west palearctic species of *Sphenophorus* by being entirely black and having similar punctuation patterns. A distinguishing characteristic of *S. acupunctatus*, is the spongy apex of the antennal club, which appears concave and is not visible in lateral view (Vaurie 1971). On the contrary, in all *Sphenophorus* species and *C. sordidus*, the spongy apex is protruding. *Cosmopolites sordidus* is further distinguishable by its robust hind legs, with the hind femora extending to

the apex of the pygidium, and tibiae equipped with long, hook-shaped extensions (Zimmerman 1968).

These distinct differences in pronotum and elytral sculpturing, make the visual identification of *S. venatus* relatively straightforward, even from poor quality photos. This facilitates the effective use of citizen science platforms to document its distribution.

However, despite these distinguishing features, there has been frequent misidentification of *S. venatus* as *S. meridionalis* in Italy and other regions, most probably due to misinterpretations of the description of *S. meridionalis* from old literatures. Misidentified photographs of *S. venatus* individuals appear in citizen science forums, such as Natura Mediterraneo and Entomologi Italiani, labelled as

Figure 2. Details of pronotum and elytral punctuation: **A**, **D** *Sphenophorus venatus* (Say, 1831); **B**, **E** *Sphenophorus meridionalis* Gyllenhal, 1838; **C**, **F** *Sphenophorus piceus* (Pallas, 1771).

S. meridionalis. This confusion is not limited to public records but is also present in scientific literature; in Lugo et al. (2022) the specimen representing *S. meridionalis* in figure 1D, is actually a *S. venatus*, with the distinctive rows of large pits on the elytral interstices, clearly visible.

All the recorded localities of *S. venatus* in the Balkans and eastern Mediterranean region are located near the coastline or not very far inside the mainland, often in large cities. This proximity may be a significant indication of the way of the species rapid spread, i.e. with ships, as coastal areas often serve as entry points for invasive species due to activities such as trade, tourism, and transportation, with many invertebrates unintentionally introduced to coastal cities as hitch-hikers on ships (Padayachee et al. 2017). The ecological impact of the species in the Balkans and the Eastern Mediterranean remains unclear. Although it is considered a turfgrass pest in parts of its native range (Dupuy and Ramirez 2016), its presence in Sardinia since at least 2008 has not caused any concern. This may partly explain why it was often confused with *S. meridionalis*; without visible damage, it has likely evaded scrutiny.

Regarding the Palearctic species of the genus *Sphenophorus* in Greece, where the majority of the examined specimens collected, the combined data from von Oertzen (1886), Germann et al. (2024), and the specimens examined in this study indicate that these species are distributed widely across mainland Greece and the Ionian Islands. However, despite their broad distribution, all four species appear to be relatively uncommon.

Notable morphological variability was observed among the specimens. For instance, among the three individuals of *S. parumpunctatus* examined, one specimen from Timenio lacked the unpunctured area in the middle of the pronotum. Likewise, among the two examined *S. piceus*, the specimen from Nemea exhibited a matte black coloration, while the one from Mount Papikio was glossy black, the glossiest of all the examined material. Interestingly, the two largest specimens examined in this study, exceed the size ranges reported by Hoffmann (1954). The specimen of *S. parumpunctatus* collected in Timenio in 2019 measures nearly 16 mm (Hoffmann: 10–14 mm), while the *S. abbreviatus* specimen from Priapos in 2000 also measures 16 mm (Hoffmann: 10–15 mm). These findings suggest that the maximum size for the west Palearctic *Sphenophorus* species may be around 16 mm, or 20 mm including rostrum.

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